THE VOICE.

La Voix, sa Culture physiologique: Théorie nouvelle de la Phonation. Conférences faites au Conservatoire de Musique de Paris en 1906. By Pierre Bonnier. Pp. 299. (Paris: Félix Alcan, 1907.) Price 3.50 francs.

THIS is an excellent work on the physiology of the voice. Nowhere have we met with a clearer exposition of the anatomical structure of the larynx, the mode of voice production, and the mechanism of breathing. The diagrammatic figures showing the action of the muscles are specially to be commended. The author rightly discredits the old-fashioned view that a vocal tone is produced by the vibrations of the margins of the true vocal cords. In a sense this is true, but it is an incomplete statement of the truth, and M. Bonnier lays stress on the variations of pressure that occur in the laryngeal cavity. The vocal cords are brought close together, and then, by an expiratory effort, the pressure below the cords becomes much greater than in the ventricles of Morgagni above the cords and in the upper part of the larynx. This increased pressure opens the chink of the glottis, and the cords are slightly stretched upwards. The air escapes, the cords again approximate, and there is a fall of pressure below the cords whilst the pressure rises in the ventricles and in the upper part of the larynx. There is thus a puff of air. This is repeated again and again according to the period of the vocal tone produced.

M. Bonnier associates the old view with the name of Helmholtz, and he so far claims the newer view as his own. This is scarcely correct. Undoubtedly Helmholtz expounded the mechanism of tone production on the "puff" theory, and he likened the acoustic action of the larynx to that of a syren. The view so ably dealt with by M. Bonnier is now almost universally taught. M. Bonnier gives an admirable account of the action of the resonating cavities in modifying quality of tone. He illustrates this by an analysis of the bass, tenor, alto, and soprano voice, and he indicates the physiological mechanism which brings out the best quality in each of these voices, a mechanism which can be trained under a competent teacher. He shows that there is a constant interplay between the muscular mechanisms and the air pressures in the larynx, so that under favourable conditions the best qualities of the voice may be produced. Accent in singing, as the effort of the singer to give emotional expression, is brought about by the action of the nervous arrangements on the muscular mechanism.

There are many excellent remarks on articulation, on the trill, on the means for, as it were, "flinging out" the voice so as to make it effective, and on the vocal registers. There is a brief account of some of the mistakes by which the voice may be injured, and the volume closes with a description of the results obtained by a clinical examination (by laryngoscope and otherwise) of forty-four voices of persons who desired to become professional singers. Of the forty-four, eight were chosen, and thirty-six were rejected as having such qualities that no amount of training could efficiently fit them for following a *carrière lyrique*. This book places voice production on a scientific basis. Many teachers have taught empirically, and with remarkable success, but they may have made mistakes. M. Bonnier conveys the scientific knowledge that is always the surest guide.

J. G. M.

THREE BOOKS ON ELEMENTARY CHEMISTRY.

A Method of Teaching Chemistry in Schools. By A. M. Hughes and R. Stern. Pp. xii+120. (Cambridge: University Press, 1906.) Price 3*s*. net.

Elementary Science of Common Life (Chemistry). By W. T. Boone. Pp. 252. (London: W. B. Clive, University Tutorial Press, Ltd., 1906.) Price 2*s*.

An Elementary Study of Chemistry. By Dr. W. McPherson and Dr. W. E. Henderson. Revised edition. Pp. viii+434. (Boston and London: Ginn and Co., Ltd.) Price 6*s*.

THE authors of the "Method of Teaching Chemistry in Schools" claim to have discovered a new method of teaching elementary chemistry, based on the principle of working from the known to the unknown. Although one may be inclined to question the novelty of the discovery, there is no doubt of the efficacy of the principle. The book is written in the form of suggestions to the teacher. The directions are clear and concise, the illustrations are excellent, and the book is embellished by photographs of the pioneers of chemistry. But it is not the method of treatment, which is scarcely new, or the arrangement of the subject, which might conceivably be improved, which commends the book. What impresses one favourably is its manner rather than its matter. It is written by thoughtful teachers, who have striven in an attractive way to get as much out of each simple problem as it can be made to yield. For the beginner in science, the imparting of many facts or the elucidation of general theories is not wanted; what is required is the cultivation of intelligent observation and of common-sense explanations of phenomena, and if this is the aim of the little book, as we take it to be, it undoubtedly fulfils its purpose.

The modest volume on "Elementary Science of Common Life," by Mr. Boone, is one of the "Organised Science Series," and is well up to the standard of the companion volumes. There is really very little that demands anything but favourable criticism. The subject is handled in a simple fashion, the examples are well chosen, and there is wealth of verbal and graphic illustration drawn from "common life." One is inclined to ask oneself in reading a book of this type whether anything is gained by formal definitions of well-known phenomena such as heat and light. Heat and light are first realised as sensations. Later, they are recognised by certain objective effects, such as expansion in one case and chemical change in the other, and this is, of course, pointed out. But does the definition

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of temperature "as indicating a particular physical condition of that body while heat is the agency to which this condition is due," which is true enough, though it applies just as well to colour and light, convey information worthy of being recorded in formal language?

The "Elementary Study of Chemistry" is intended for much older students than either of the foregoing, and is an introduction to the serious study of chemistry as a separate science. The authors do not lay claim to any great originality in the treatment of their subject, and in this we must concur. At the same time, the fact that it resembles other elementary text-books does not detract from its merits. The authors have done their work thoughtfully and well. The matter is well arranged, the style is simple and concise, the paper and printing are good, and the illustrations are numerous and well executed.

As in the volume just referred to, we are soon confronted with definitions. "Physical changes," we are told, "are those which do not involve a change in the composition of the matter," but we are not told what "composition" means. "Chemical changes involve a change in the composition of matter." How would isomeric change be classified—say the conversion of ammonium cyanate into urea—according to this definition? Why attempt to define where there is no clear boundary, for it is not always easy to say where physical change ends and chemical change begins?

Apart from this we have nothing but praise for the book. The information is well up to date. There are suggestive chapters on "solutions," "chemical equilibrium," and the new learning; and if the teaching is a little didactic in places and leaves many obvious questions unanswered, it must be ascribed to the highly condensed treatment of the subject.

J. B. C.

MEDICAL SCIENCE.

(1) *The Control of a Scourge, or, How Cancer is Curable.* By Charles P. Childe. Pp. ix+299. (London: Methuen and Co., n.d.) Price 7*s*. 6*d*. net.

(2) *The Essential Similarity of Innocent and Malignant Tumours. A Study of Tumour Growth.* By Charles W. Cathcart. Pp. xii+79; thirty-eight plates. (Bristol: John Wright and Co.; London: Simpkin Marshall, Hamilton, Kent and Co., Ltd., 1907.) Price 9*s*. 6*d*. net.

(3) *Guy's Hospital Reports.* Edited by F. J. Steward and Herbert French. Vol. lx., being vol. xlv. of the third series. Pp 373. (London: J and A. Churchill, 1906.)

(1) IN "The Control of a Scourge" Mr. Childe deals with the cancer problem particularly in relation to prevention and cure. Whether the subject could not have been dealt with in a quarter of the space with equally satisfactory results as regards the general public is a question, many of the details introduced being quite unnecessary for the average man or woman to know. What is really wanted is the broadest issue of a leaflet indicating the "danger signals" warning of the development of a cancerous growth. The medical profession has naturally shrunk from doing this, savouring, as it might seem, of unprofessional advertising; but the importance of the subject warrants this being done, and there is a good precedent in the case of tuberculosis. Mr. Childe's main theme is that cancer usually indicates itself at an early stage by certain signs—"danger signals"—a lump, a sore, an abnormal discharge, &c., and that the public should be educated to understand the importance of these, so that they may seek advice at the earliest possible moment; and, this being so, cure would be possible in a much larger proportion of cases than at present. For cancer is at first a *local* disease; in four-fifths of the cases, at least, it is situated in regions eminently accessible for surgical operation, and complete removal while in the local stage would mean cure.

To the layman who wants to know all about cancer, and to the general practitioner who desires to be in a position to discuss the cancer problem with laymen, the book can be thoroughly recommended.

(2) The second work is for the professional reader, and is illustrated with some beautiful plates. It is, of course, admitted that there is no sharp line of demarcation between innocent and malignant growths, but we should take exception to the unqualified statement (p. 71) that "the same tumour may be at one time innocent and at another time malignant." Even now the minuter characters of the structure of neoplasms are by no means completely worked out, and it is surely previous to assert that tumours having an identity of structure may at one time be innocent and at another malignant. In the case of some of the infectious warts, &c., they should be regarded as infective granulomata rather than as true neoplasms. If not, it would be quite as logical to classify the granulomatous new formations of tubercule, syphilis, &c., as neoplasms.

(3) This volume of the Guy's Hospital reports contains a number (sixteen) of interesting papers, many of which have, however, been published elsewhere. Among others, Dr. F. Taylor discusses the chronic relapsing pyrexia of Hodgkin's disease, Drs. Bainbridge and Beddard discuss the mechanism of secretion by the renal tubules in the frog, and Dr. Buzzard and Mr. Allen describe observations on the effects produced by choline upon animals. The volume contains much matter of scientific value, and to old Guy's men the "school" news which is included will add to its interest.

R. T. H.

OUR BOOK SHELF.

Ightham; the Story of a Kentish Village and its Surroundings. By F. J. Bennett. Pp. viii+158; illustrated. (London: The Homeland Association, Ltd., 1907.) Price 7*s*. 6*d*. net.

THE area described lucidly in this volume is one of the most interesting in the country to the archæologist, the geologist, and the general student of nature. It comprises some sixteen square miles north of Tonbridge, lying between Maidstone and Sevenoaks, and under the unremitting observation of Mr. Benjamin Harrison, the White of Ightham, has probably been surveyed in greater detail than any other similar rural

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